REMARKS

Reconsideration is respectfully requested.

Claims 1 through 5, 7 through 17, and 21 remain in this application. Claims 6, 18 through 20, and 22 through 38 have been cancelled. No claims have been withdrawn. Claims 39 through 46 have been added.

Paragraph 2 of the Office Action

Claims 1 through 5, 7 through 27 and 29 through 38 have been rejected under 35 U.S.C. Section 103(a) as being unpatentable over Lambrecht in view of McIntosh.

Claims 16 through 20, 24 through 27 and 35 through 38 have been rejected under 35 U.S.C. Section 103(a) as being unpatentable over Eatwell in view of McIntosh.

The claims have been amended to emphasize the ability of the invention to utilize the elements integral to an otherwise conventional portable computer and conventional headphones without requiring specialized hardware for the computer or specialized headphones.

For example, claim 1 requires (emphasis added):

> A personal computer comprising:
> a housing;
> *a microphone built into the housing for detecting ambient noise;*
> a processor integrated into the housing, the microphone being coupled to the processor;
> a noise cancellation module operable on the processor, the noise cancellation module generating a noise cancellation signal responsive to the ambient noise detected by the microphone; and
> a digital signal processor coupled to the noise cancellation module and *configured to mix the noise cancellation signal with an audio signal provided from a desired source the digital signal processor being connected to a standard headphone compatible audio output connection integrated on the housing* to reduce noise perceived by a user of a headphone connected to the standard headphone compatible audio output connection.

In the previous Office Action, it was argued in the "Response to Arguments" that (italics in the original, underline added):

> Regarding applicant argument of McIntosh not teaching the built-in microphone (remarks, page 13), this is met by Lambrecht. As discussed in the rejection of claim 1, while Lambrecht does not explicitly teach that the microphone is of a built-in type, Lambrecht teaches *the microphone is physically located with the speaker,* and the speaker in tern is a conventional speaker (col. 3, lines 48-53). One of ordinary skill in the art would realize that for the PC (notebook computer 154) as shown in figure 1, the speaker would be built into the PC / notebook computer. In other words, the microphone would be built into the PC / notebook computer, to be physically located with the speaker.

This portion of the rejection attempts to lay out several steps that would allegedly lead one of ordinary skill in the art to modify the Lambrecht device to include the "built-in microphone for detecting ambient noise" required in claim 1. It is asserted that this requirement of the claims is "met by Lambrecht", but is then conceded that this is not something that Lambrecht actually teaches, but is apparently something that the Examiner feels that one of ordinary skill in the art would arrive at based upon the belief that Lambrecht "teaches that the microphone is located with the speaker", and refers to the Lambrecht patent at col. 3, lines 48 through 53, which states:

> Microphone 108 is a conventional microphone that converts sound to electrical audio signals. In one embodiment, the microphone is physically located with the speaker or headphone. Speaker 110 is conventional speaker or headphone for converting electrical audio signals to audible sound.

However, the disclosure of the Lambrecht patent does not simply state that the microphone is "physically located with the speaker", but states that the microphone is located with the speaker or headphone (which one of ordinary skill in the art recognizes is a "speaker"). The Lambrecht patent shows and discusses the speaker being located in the headphones, so the reasoning of the rejection is based upon the assumption that one of ordinary skill in the

art would be motivated to move the speaker (as well as the microphone) to the notebook computer shown in Lambrecht, without providing any basis for such a modification, which is contrary to the actual disclosure of Lambrecht which shows the speaker integrated into headphones (156) in Figure 1, and not in the notebook computer as asserted in the rejection.

Perhaps more importantly, in order for the "movement" (or utilization) of the microphone in the notebook computer in order to "physically locat[e]" the microphone "with the speaker" in the notebook computer, one basically removes the need to utilize the speaker of the headphone (as this would move the speaker away from the microphone). However, this would just lead one of ordinary skill in the art away from the claimed invention, which requires "a digital signal processor for mixing the noise cancellation signal with an audio signal provided from a desired source for provision to a standard headphone compatible audio output connection to reduce headphone noise". Thus, once the allegedly obvious modification is made regarding the microphone, one has removed any need to use the headphones and the headphone output connection.

Further, it is submitted that the discussion in the Lambrecht patent also leads one to positioning the speaker in the headphones, and not in the notebook computer. See, for example, the "Summary of the Invention" in the Lambrecht patent at col. 2, lines 9 through 25, where it states (all emphasis added):

> The present invention contemplates a system and method for active noise cancellation using a waveform playback device. The present invention uses existing hardware, such as a personal computer *with an attached* waveform playback device. The background noise, or other noise to be canceled, may be sampled via a microphone. The noise to be canceled is referred to as a "noise environment." A software application running on a host processor calculates a cancellation signal. A cancellation signal is a signal that combines with the noise environment to negate or reduce the noise perceived by a listener. The cancellation signal is converted into a cancellation sample signal compatible with the waveform playback device. The

> sample signal is conveyed to the waveform playback device and the device outputs an audio signal of a selected sample at the appropriate pitch and duration. The audio signal is output to the listener via a speaker or headphone to accomplish the noise cancellation.

It is submitted that this summary does not suggest to one of ordinary skill in the art that any speaker of the "waveform playback device", much less any microphone, should be integrated into the notebook computer. Lambrecht further states at col. 2, lines 55 through 64, that:

> Referring now to FIG. 1, a block diagram of one use of the waveform playback device in accordance with present invention is shown. FIG. 1 illustrates a listener 152 using a computer 154 with a waveform playback device in accordance with present invention to cancel the background noise of an airplane. Computer 154 samples the background noise environment and output a noise cancellation signal to listener 152 via headphones 156. The noise cancellation signal combines with the background noise to reduce the background noise perceived by listener 152.

The remainder of the Lambrecht patent has been reviewed and it appears that there is no further discussion of the placement of the speaker other than in the headphones. However, it is noted that the Lambrecht patent describes the system in the context of reducing environmental noise occurring in an airplane, and it is submitted that unless the speaker was located in the relatively controlled environment of the headphone cups, the Lambrecht system would be incapable of generating a sound of sufficient volume in free air to overcome the noise of the airplane in the interior of the plane, even in a localized area, unless the air is confined within the earcup of the headphones. Thus, it is submitted that one of ordinary skill in the art would not be motivated to apply the Lambrecht system to any speaker and microphone in the notebook computer, as such placement would be grossly inadequate for the purpose of reducing the environmental noise in the airplane environment.

Thus, the rejection relies upon the alleged obviousness of moving the microphone with the speaker, but also upon the alleged obviousness of

moving the speaker from the headphones to the notebook computer. It is submitted for the reasons set forth in the Office Action that one of ordinary skill in the art would not be motivated to move the speaker of the "waveform playback device" from the headphones to the notebook computer, nor the microphone to the notebook computer.

It is also submitted that the MacIntosh patent would not lead one to make the allegedly obvious modification and for reasons set forth previously and repeated below, it is believed that the MacIntosh patent would lead one of ordinary skill in the art away from the allegedly obvious modification.

It is further alleged in the "Response to Arguments" that:

> Applicant argued that McIntosh does not teach a standard headphone compatible audio output connection (remarks, page 13). The examiner's position is that the claim language (claims 1,8,13,16 and 24) requires *audio output connection* which is compatible with a standard headphone, which is met by Lambrecht who teaches the output port to the user's headphone, which is certainly compatible with any standard headphone. Noise cancellation processing is performed before output (figs. 2-4).

This current "position" is exactly opposite of the position taken by the Examiner in the previous Office Action, where it was stated that (emphasis added):

> Lambrecht fails to teach that a digital signal processor for mixing the noise cancellation signal with an audio signal provided from a desired source for provision to a standard headphone compatible audio output connection to reduce headphone noise and does not clearly teach a built-in microphone for detecting ambient noise and Lambrecht indicates that the computer with a speaker and microphone for the noise cancellation; and it is well known (official notices is taken) in the art that a built-in microphone for detecting ambient noise in the computer.

and it was then contended that (emphasis added):

> However, McIntosh teach a digital signal processor (see fig. 4, (DSP)) for mixing the noise cancellation signal with an audio signal (AUDIO L, R) provided from a desired source for provision to a

> standard headphone (12) compatible audio output connection to reduce headphone noise (see col. 3 line 24-col. 4 line 55).

Thus, the present position is submitted to be different (and essentially opposite to) the position previously taken. It is thus alleged that the Lambrech patent "teaches the output port to the user's headphone, which is certainly compatible with any standard headphone". However, the Office Action does not point to anything in the Lambrecht patent to support this assertion of what Lambrecht teaches. The undersigned cannot locate anything in the description or drawings of Lambrecht that establishes the character of any output port in Lambrecht. This appears to be supposition of what Lambrech might teach, but does not provide any evidence beyond this supposition. Further, the rejection is based upon the movement of the speaker (and thus the microphone) to the notebook, so it is not understood how the Lambrecht notebook modified in the manner allegedly obvious manner set forth in the rejection (with the speaker and microphone of the headphones integrated into the notebook computer) would include any output port for "provision to a standard headphone compatible audio output connection to reduce headphone noise". The rejection depends upon one of ordinary skill in the art moving the speaker of the Lambrecht system to the notebook computer so that the microphone would also be moved to the notebook computer, so this would appear to obviate any need to provide the "noise cancellation signal" to an output port of the notebook computer, since the logic of the rejection relies upon the speaker being moved to the notebook computer (or more likely, the utilization of the speaker in the notebook computer so that a microphone in the notebook is also used).

The "Response to Arguments" further states:

> Regarding applicant's argument that McIntosh does not teach detecting ambient noise (remarks, page 14), McIntosh teaches detecting ambient noise (col. 2, lines 60-61), which is compensated for.

The MacIntosh patent states at col. 2, lines 60 through 61 that emphasis added):

> ... reduce at least the loudest tonal noises penetrating the earcup (such tonal noises being engine and propeller noises, and harmonic vibrations of fuselage components).

It is submitted that this portion of MacIntosh only makes it clearer that the MacIntosh system does not deal with "ambient noise", but the noise that "penetrate[es] the earcup". This is completely consistent with the remarks in the previous response that MacIntosh leads one away from the detection of "ambient noise".

As previously noted, it is submitted that one of ordinary skill in the art, considering the disclosure of the McIntosh patent would recognize thathe McIntosh patent discusses a system in which the DSP receives an "analog error signal" from a microphone positioned in the earcup of the headphones. See, e.g., the McIntosh patent at col. 2, lines 33 through 51 (emphasis added):

> The invention provides an active noise cancellation aircraft headset system which includes a headset of the type having a headband and a pair of earcups mounted to the headband. A speaker is mounted within each of the earcup for receiving and acoustically transducing a composite noise cancellation signal, and a microphone is also mounted within each earcup for transducing acoustic pressure within the earcup to a corresponding analog error signal. An analog filter receives the analog error signal and inverts it to generate an analog broadband noise cancellation signal. The analog error signal is also provided to an analog to digital converter, which receives the analog microphone error signal and converts it to a digital error signal. A DSP takes the digital error signal and, using an adaptive digital feedback filter, generates a digital tonal noise cancellation signal. A digital to analog converter then converts the digital tonal noise cancellation signal to an analog tonal noise cancellation signal so that it can be combined with the analog broadband noise cancellation signal.

Thus, one of ordinary skill in the art considering the McIntosh patent understands that the noise cancellation signal is derived from the microphone located in the earcup, and thus is derived from sounds that exist

in the interior of the earcup (such as the sounds that pass through the earcup). The placement of the microphone in the earcup is further discussed at col. 3, lines 31 through 47 (emphasis added):

> FIG. 3 depicts the essential elements of a headset system of the invention, providing both analog broadband noise cancellation and digital adaptive tonal noise cancellation. A headset 10 includes an earcup 12 carrying a conventional circumaural cushion 14, a conventional speaker element 16 and an error microphone 18 mounted within the earcup 12. External sounds penetrating the earcup 12 are detected by the error microphone 18, which transduces the sounds (i.e., the acoustic pressure) to a corresponding analog error signal. The error signal is provided to a conventional (nonadaptive) compensation filter H_{comp}, which receives the analog error signal and inverts it to generate an analog broadband noise cancellation signal. This cancellation signal is amplified by a variable gain amplifier 22, and the amplified analog cancellation signal is then provided to summing amplifier 24, the output of which drives the speaker 16 to cancel external noise which has penetrated the earcup 12.

The McIntosh patent states that the placement of the microphone in the earcup permits the noise reduction system to address the noise that actually penetrates the earcup (rather than compensating sounds that do not enter the earcup), as stated at col. 3, lines 57 through 59 (emphasis added):

> The analog error signal from the microphone is also provided to a DSP through a suitable A/D converter. The DSP utilizes an adaptive feedback filter to generate a digital tonal noise cancellation signal which is converted by a suitable D/A converter to an analog tonal noise cancellation signal. The tonal noise cancellation signal is then provided to the summing amplifier 24, where it is combined with the broadband analog cancellation signal to form a composite cancellation signal. The composite cancellation signal is used to drive the speaker 16 to at least partially cancel aircraft noise which has penetrated the earcup 12.

Further, it is noted that the placement of the microphone in the earcup of the McIntosh headphones is needed for the "active control of the analog cancellation loop gain". Thus, assuming for the sake of argument that one of ordinary skill in the art is actually motivated as set forth as stated in the rejection of the Office Action to combine the McIntosh system with the Lambrecht to obtain "active control of the analog cancellation loop gain",

then one would also be motivated to position the microphone *in* the earcup, rather than positioning the microphone anywhere else to simply detect "ambient noise". Detecting "ambient noise" outside the earcups would not provide the "active control" function. Thus, utilizing the built-in microphone in a portable computer, as is alleged in the rejection, would not provide the benefits set forth in the Office Action.

Thus, despite the allegation in the rejection that it would have been obvious to utilize the built-in microphone of the computer, the McIntosh patent clearly leads one of ordinary skill in the art to positioning the microphone in an earcup of the headphones, and leads one away from any use of the built-in microphone.

Further, since the McIntosh system clearly requires headphones that employ a microphone as well as speakers, and therefore it is submitted that one of ordinary skill in the art, considering the McIntosh teaching, would not understand that the McIntosh system would employ "a standard headphone compatible audio output connection". It is submitted that one of ordinary skill in the art would expect that any system utilizing the McIntosh system would employ specializes headphones that not only include a microphone, but a microphone positioned *in* the earcup. It is therefore submitted that the discussion in the McIntosh patent does not describe a standard headphone compatible audio output connection, as the McIntosh system clearly contemplates a headphone connection that includes both "input" and "output", which is not provided by a standard headphone compatible audio output connection. One of ordinary skill in the art, considering the disclosure of McIntosh patent, would not consider a connection that provides bidirectional communication to be a standard audio output connection.

With respect to the rejection based upon the allegedly obvious combination of the Eatwell and McIntosh patents, it is submitted that the

above comments regarding the combination of Lambrecht and McIntosh also apply to this combination. It is alleged in the rejection of the Office Action that:

> ... but Eatwell fails to disclose a digital signal processor for mixing the noise cancellation signal with an audio signal provided from a desired source for provision to a standard headset compatible audio output connection to reduce headphone noise.
>
> However, McIntosh discloses a digital signal processor (see fig. 4, (DSP)) for mixing the noise cancellation signal with an audio signal (such as (AUDIO, L AND R)) provided from a desired source for provision to a standard headset compatible audio output connection to reduce headphone noise (see col. 3 line 23-col. 4 line 55).
>
> Therefore, it would obvious to one of ordinary skill in the art at the time invention was made to combine the teaching of McIntosh into Lambrecht to provide not only active control of the analog cancellation loop gain to maximize the effectiveness of the broadband analog cancellation but also uses the adaptive feedback filter/algorithm to substantially reduce at least the loudest tonal noises penetrating the earcup (such tonal noises being engine and propeller noises, and harmonic vibrations of fuselage components).

As noted above, the DSP of the McIntosh patent is strongly tied to the provision of a signal from the microphone in the earcup of the headphones, especially to provide the "benefits" that are claimed in the rejection to motivate the combination. As set forth above in the noted portions of the McIntosh patent, the "active control of the analog cancellation loop gain" cited in the rejection of the Office Action need to have this signal corresponding not to "ambient noise", but to the actual sound being produced from the speaker in the headphone. Therefore, the microphone located in the computer of Eatwell would not be able to provide the benefits set forth by McIntosh from the DSP, and would require the direct feedback provided by a microphone located in the same earcup as the speaker reproducing the altered sound.

Again, since the McIntosh DSP system requires a microphone proximate in the earcup to the speaker of the headphone, it is submitted that "a standard headphone compatible audio output connection" is not disclosed

to one of ordinary skill in the art.

Therefore the cited patents, and especially the allegedly obvious combination of Lambrecht, Eatwell and McIntosh set forth in the rejection of the Office Action, would not lead one skilled in the art to the applicant's invention as required by claims 1, 8, 13, 16, and 24, and therefore are submitted to be in condition for allowance.

Withdrawal of the §103(a) rejection of claims 1 through 5, 7 through 27 and 29 through 38 is therefore respectfully requested.

CONCLUSION

In light of the foregoing amendments and remarks, early reconsideration and allowance of this application are most courteously solicited.

Respectfully submitted,

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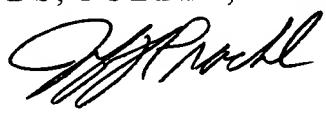

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